

A New Record of Sea Urchin (Echinoidea: Echinothurioida) from Jeju Island, Korea

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ABSTRACT

Some sea urchins were collected from the subtidal rocky bottom along the coastal line in Jeju Island by SCUBA diving in April 2005 and identified on the basis of their morphological characteristics. Among them, *Asthenosoma ijimai* Yochiwaru, 1897 was newly recorded from Korea and redescribed based on the specimen collected at 20m deep in southern breakwater of Seogwipo harbor. The order Echinothurioida including family Echinothuriidae and genus *Asthenosoma* was firstly recorded in Korea. Seventeen species of echinoids are reported to be distributed in Jeju Island of Korea.

Key words: taxonomy, Echinoidea, Echinothurioida, Korea

INTRODUCTION

Echinothurioida is one order of the regular echinoids composing class Echinoidea. Echinothurioid species are characterized to have flexible and distinctly flattened test and relatively short or slender spines with hollow axis. Echinoids play an important role in marine ecosystem as benthos and are mainly distributed in the neritic ocean and particularly abundant in the Indo-West Pacific and North Pacific Ocean. More than 900 species have been reported from the all over the world up to the present time (Brusca and Brusca, 2003).

Since the first report by Sladen (1879) on echinoids, 29 species have been reported in South Korea so far. Among them, 16 species of echinoids such as *Goniocidaris biserialis*, *Stereocidaris japonica*, *Prinocidaris baculosa*, *Coelopleurus undulatus polymorphus*, *Diadema setosum*, *Mespilia globulus*, *Microscyphus olivaceus*, *Pseudocentrotus depressus*, *Toxopneustes pileolus*, *Hemicentrotus pulcherrimus*, *Anthocidaris crassispina*, *Clypeaster japonicus*, *C. virescens*, *Astriclypeus manni*, *Pseudomaretia alta* and *Brissus agassizi* have been recorded in Jeju Island. Ten species of these 16 species are found only in the area of Jeju Island (Shin and Rho, 1996; Shin, 2000).

Some echinids were collected from the coast of Jeju Island by SCUBA divers during the period of August 2002 to July 2005. They were preserved in about 70% methyl alcohol and identified on the basis of their morphological characteristics. Among them, *Asthenosoma ijimai* Yochiwaru, 1897

having the peculiarly flexible test was newly recorded from Korea. The redescription and photographs of this species were given on the basis of the specimen collected at 20 m deep in southern breakwater of Seogwipo harbor. The order Echinothurioida including family Echinothuriidae and genus *Asthenosoma* was firstly recorded in Korea. Therefore 17 echinoid species are reported to be distributed in Jeju Island of Korea.

SYSTEMATIC ACCOUNTS

Phylum Echinodermata Klein, 1734

Class Echinoidea Leske, 1778

Subclass Regularia Latrille, 1825

Order ¹*Echinothurioida Claus, 1880

Test flexible and distinctly flattened. Ambulacra not very narrow at least on aboral side, continuing to mouth. Spines short or slender with hollow axis.

Family ²*Echinothuriidae Thomson, 1872

Ambulacra trigeminate. Primary spines of oral side club-shaped with a thick skin-clad or terminating in a hoof without skin-clad. Tubercles non-crenulate.

Genus ³**Asthenosoma* Grube, 1867

Test large, low-hemispherical. Membranous interstices conspicuous on aboral side. Ambulacral pores on both oral and aboral sides in three dense series. Spines of aboral side invested by a thick skin-sheath and banded with dark and light colours. Primary spines of oral side terminating in a

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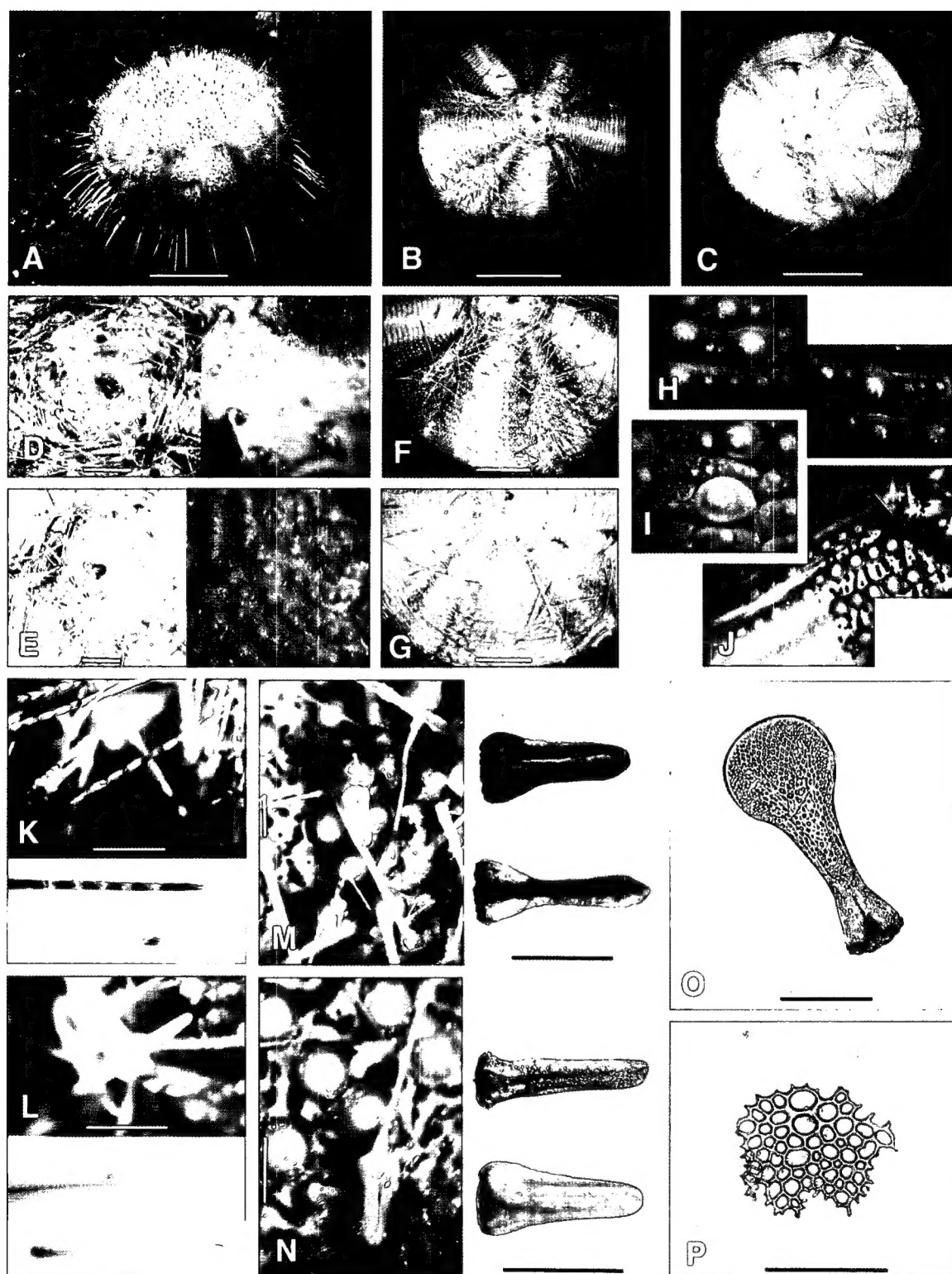


Fig. 1. *Asthenosoma ijimai* Yoshiwara, 1897 A, whole body in upper side view; B, aboral side; C, oral side; D, apical system; E, peristome; F, interambulacra and ambulacra of aboral side; G, interambulacra and ambulacra of oral side; H, ambulacra of oral side; I, ambulacra of oral side; J, interambulacra of adoral side; K, spines on aboral side; L, spines on oral side; M, large tridentate pedicellariae; N, small tridentate pedicellariae; O, triphylloids; P, perforated plate of podium. Scale bars=5 cm (A, B, C), 1 cm (D, E), 2 cm (F, G), 3 mm (K, L), 2 mm (M, N), 0.5 mm (O), 0.1 mm (P).

slender hoof. Tridentate and triphyllous pedicellariae present.

Type-species: *Asthenosoma varium* Grube, 1867

¹* ***Asthenosoma ijimai* Yoshiwara, 1897 (Fig. 1A-P)**

Asthenosoma ijimai Yoshiwara, 1897 p. 8, pl. 2, figs 8-12; Mortensen, 1904, p. 87, pl. 3, figs 1, 2, pl. 5, figs 1-3, pls. 10, 12-14; Tokunaga, 1905, pl. 4, figs 1, 2; Ohshima, 1947, p. 592, fig. 1714; Utinomi, 1954, p. 342; Chang et al., 1964, p. 79; Nishiyama, 1968, p. 310; Shigei, 1981, p. 198; 1986, p. 40, pl. 9, fig. 1, pl. 66, fig. 3, pl. 67, figs 1, 2, pl. 68, fig. 1; Saba et al., 1982, p. 33, pl. 24, figs 3, 4.

Material examined. Seogwipo (on rocky sediment at 20 m deep), 22 April 2005, 1 individual, S.H. Kim.

Diagnosis. Test large, somewhat pentamorous, flexible but not fragile, and not low. Primary tubercles not very large, occurring only on oral side and on little part above ambitus. Small tubercles forming a horizontal series on each interambulacral plate of aboral side. Spines of aboral side more or less distinctly annularly constricted and banded with dark and light colors. Primary spines of oral side terminated in a slender hoof.

Description. Horizontal diameter=130 mm, Vertical diameter=42 mm, Longest spine=37 mm. Test large and flexible with tumid edge. Coronal plates very slender and numerous. Membranous interstices between coronal plates not broad, distinct only on aboral side.

Ambulacra: Width at ambitus a little more than half that of interambulacra. On oral side, primary tubercles do not form regular longitudinal series. Secondary tubercles few, not forming regular horizontal series. Secondary plates rather close to outer edge of primary plates, plate-pair adjoining close together. Pore-pairs arranged in three close series. On oral side, poriferous and interporiferous zones distinguishable; the former as broad as the latter and provided with a few scattered small tubercles. In interporiferous zone, each primary plate carries one or two tubercles.

Interambulacra: On oral side, each plate carries two large tubercles arranged alternatively on adjoining two plates. Plates covered with scattered miliary tubercles. On aboral side, sutures between plates very oblique. Secondary tubercles form a regular horizontal series on each plate.

Apical system (24 mm): Genital plate elongate-triangular and genital pores surrounded by a number of small plates extending along inner midline. Madrepolite divided into several pieces and madrepolite pores distributed on adjoining two ocular plates. Peristome (31 mm) rather large.

Spines on aboral side rather short, invested with skin-

sheath gradually thickening and abruptly thin near point. Primary spines on oral side rather long and stout. A number of small spines invested by skin-sheath among secondary spines on oral side. Large tridentate pedicellariae have valves joining only at point. Small tridentate pedicellariae have long and narrow valves joining in their whole length. Triphyllous pedicellariae present.

Color: Spines on aboral side and spines on oral side distinctly white with bright reddish-brown bands but tip white. Skin on naked median areas dotted with reddish-brown color.

Distribution. Korea (Jeju Island); Japan (Sagami Bay-Kagshima Bay); Malay region (Jolo, Kei Islands).

Remarks. Only one specimen was collected but we didn't hesitate to identify it with very peculiar morphological characteristics. This species has flexible test which is very remarkable and first reported character in Korean echinoids. And also it has slender fine spines on the aboral side whose tip is very thin and sharp.

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REFERENCES

- Brusca, R.C. and G.J. Brusca, 2003. Invertebrates, 2nd ed. Sinauer Association, Inc., Publ., Massachusetts, pp. 1-225.
- Chang, Y., Y. Liao, H. Go and H. Tei, 1964. Echinoids. In, Illustrated Encyclopedia of Chinese Animals (Echinoderms), Kexue (Science) Publisher, Peking, pp. 74-101 (in Chinese).
- Mortensen, T., 1904. On some echinothuroids from Japan and Indian Ocean. Ann. Mag. Nat. Hist., Ser. 7, 14: 81-93, pls. 3-5.
- Nishiyama, S., 1968. The echinoid fauna from Japan and adjacent regions, Part 1. Paleont. Soc. Japan Spec. Pap., 11: 1-277, pls. 1-18.
- Ohshima, H., 1947. Echinoidea. In, Illustrated Encyclopedia of the Fauna of Japan (revised ed.), Hokuryu-kan, Tokyo, pp. 576-596, figs 1671-1727 (in Japanese).
- Saba, M., Y. Tomida and T. Kimoto, 1982. Echinoderm fauna of Ise Bay, and the northern and the middle parts of Kumano-nada. Bull. Mie Pref. Mus. Nat. Sci., 4: 1-82, pls. 1-34.
- Shigei, M., 1981. A study on the echinoderm fauna of the East China Sea and the coastal waters of southern Korea, Kyushu, Ryukyu and Taiwan. Publ. Seto Mar. Biol. Lab., 26: 192-241.

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- Shigei, M., 1986. The sea urchins of Sagami Bay. Biol. Lab. Imp. Hous., Marugen Co. Ltd., Tokyo, pp. 1-204, pls. 1-126.
- Shin, S. and B.J. Rho, 1996. Illustrated Encyclopedia of Fauna & Flora of Korea. Vol. 36 Echinodermata. pp. 1-780.
- Shin, S., 2000. New record of two echinoids (Echinodermata, Echinoidea) in Korea. Korean J. Syst. Zool., 16(2): 219-226.
- Sladen, W.P., 1879. On the Asteroidea and Echinoidea of the Korean seas. Jour. Linn. Soc. London, 14: 424-445, pl. 8.
- Tokunaga, S., 1905. Japanese echini (Plates). Zool. Mag., 17, pls. 3-7.
- Utinomi, H., 1954. A check list of echinoids found in the Kii region. Pub. Seto Mar. Biol. Lab., 3: 339-358.
- Yoshiwara, S., 1897. On two new species of *Asthenosoma* from the Sea of Sagami. Annot. Zool. Japan, 1: 5-11, pl. 1.

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